

REMARKS/ARGUMENTS

Claims 19-24 and 26 were pending in the application. All pending claims are rejected on various grounds over five applied references (*Sing et al.* (USPN 6,645,818 hereinafter “*Sing*”), *Inumiya et al.* (USPN 6,054,355 hereinafter “*Inumiya*”), *Sugawara et al.* (USPN 6,841,430 hereinafter “*Sugawara*”), and *Hammond et al.* (USPN 6,680,496 hereinafter “*Hammond*”). Claims 19-24 and 26 are now pending and are discussed further in this application. The various grounds of rejections are discussed below.

Rejections Under 35 U.S.C. § 112

Claim 26 is rejected under 35 U.S.C. § 112, 1st paragraph, as containing subject matter not described in the specification. In particular the Action points out that the specification does not support the Claim 26 limitations of “forming a strained silicon channel in the gate electrode trench after lining the trench with the high-K dielectric film” and “forming a conductive gate electrode in electrical contact with the strained silicon channel”. The applicants respectfully disagree. The applicants point to language on page 20, at lines 1-13 (hereinafter abbreviated as 10:1-13) of the specification which particularly point out and describe the relevant claim language. At 20:1-13 of the Specification, the inventors describe a channel etched into the substrate followed by deposition of epitaxial silicon, then “[f]ollowing the growth of the epitaxial silicon portion, the trench is lined with a thin high-k gate dielectric film”. Thus, the trench is lined, but the “strained silicon” is not yet formed. Then the “epitaxial silicon is implanted to form strained silicon in the channel” (See, 20:10-11). Also, this is “followed by deposition of the gate conductor material”.

Thus, the applicants respectfully submit that the disputed claim language is specifically supported by the specification as indicated above. Accordingly, the applicants submit that Claim 26 is supported by the specification and drawings and that this claim should be in allowable form as now written. Therefore, the applicants request that the present rejection of Claim 26 be withdrawn.

Rejections Under 35 U.S.C. § 103

Claims 19-24 stand rejected as unpatentable under 35 U. S. C. §§ 103(a) in view of numerous references. These references and rejections are discussed in detail below.

Claims 19 and 20

Claims 19 and 20 are rejected as unpatentable over *Sing* in view of *Inumiya*.

As to Claim 19, the applicants point out that *Sing* (like *Inumiya*) requires the formation of dummy gates 20 to facilitate self-aligned fabrication. The claimed process does not use self-aligned processes, nor does it claim them. The claimed invention foregoes such processes to obtain the thermal advantages inherent in the claimed method (See, e.g., 12:4-16 of the instant Specification). So the present invention absents the dummy gate processes required in *Sing* (see the dummy gates 20, 40, of Figs 4-10 and the discussion pertaining thereto). So the present invention does not require many necessary elements of the cited art. In particular, the omission of a step to obtain the same (or in this case and improved) result is de facto indicia of non-obviousness.

Also, *Sing* does not teach or suggest etching into the underlying substrate to form a deposition trench for channel depositions as claimed in Claim 19.

One must look to *Inumiya* to make up at least these shortcomings of the *Sing*. Problematic of *Inumiya* is that the ILD layer 66 of *Inumiya* (discussed at 37:8-19, at Fig. 53B and elsewhere) is formed before the annealing steps of the claimed invention. Accordingly, the prior art annealing is conducted after ILD formation instead of before as required by the claims (e.g., “after forming the source and drain diffusion region and after annealing, covering the surface of the semiconductor substrate with a first layer of dielectric material to form a first interlayer dielectric layer”).

Thus, the annealing and densification processes of *Inumiya* when combined *Sing* teach an invention not claimed by the inventors. Also, the combination of *Sing* and *Inumiya* require steps absent from the claimed invention. Thus, the addition of dummy gates (not required by the claims) and the mis-ordering of process operations result in a non-functional invention which does not teach the limitations of Claim 19 (e.g., absence of self alignment features and so on) which significantly omits these steps.

Accordingly, for at least the reasons explained above, the applicants submit that the cited combination of references is insufficient to establish a *prima facie* case of obviousness as to Claim 19. Accordingly, applicants respectfully request that the pending ground of rejection for Claim 19 be withdrawn.

As to dependent Claim 20, nothing in the art cited above overcomes the deficiencies explained above in the discussion of the Claim 19 rejection. Accordingly, for at least the reasons explained above, the applicants submit that the cited combination of references is insufficient to establish a *prima facie* case of obviousness as to dependent Claim 20. Accordingly, applicants respectfully request that the pending ground of rejection for Claim 20 also be withdrawn.

Claims 21-24

Claims 21-24 are rejected as unpatentable over *Sing* in view of *Inumiya* and further in view of *Sugawara* and *Hammond*.

However, as respectfully pointed out above, the combination of *Sing* and *Inumiya* fail to teach the underlying claim limitations of base claim 19. Moreover, nothing in the cited portions of either *Sugawara* or *Hammond* address let alone overcome the deficiencies of *Sing* and *Inumiya* as explained above in the discussion of the Claim 19 rejection. Accordingly, for at least the reasons explained above, the applicants submit that the cited combination of references is insufficient to establish a *prima facie* case of obviousness as to dependent Claims 21-24. Accordingly, for at least the reasons explained above with respect to base claim 19, the applicants submit that the cited combination of references is insufficient to establish a *prima facie* case of obviousness as to Claims 21-24.

It should also be pointed out that the high temperature processing of the “buffer layer 2” in *Sugawara* operates at almost 900°C which is hot enough for annealing problems to occur. This will effect the post anneal process steps claimed in Claims 21-24 and will damage the claimed structures. Thus, this combination is unsuitable for use with the claimed invention. Accordingly, for at least this added reason, the cited teaches away from the cited combination and accordingly fails to make obvious the claimed invention. Therefore, applicants respectfully request that the pending grounds of rejection for Claims 21-24 be withdrawn.

Thus, for at least these reasons, the applicants respectfully submit that the cited portions of the art fail to establish a *prima facie* case of obviousness as to Claims 19-24 and accordingly

the cited art is therefore insufficient to establish an obviousness rejection under 35 U.S.C. § 103. Consequently, the applicants respectfully request that the pending grounds of rejection be withdrawn as to Claims 19-24.

Conclusion:

In view of the foregoing amendments and remarks, it is respectfully submitted that the claimed invention as presently presented is patentable over the art of record and that this case is now in condition for allowance.

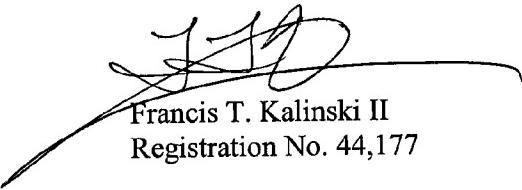
Accordingly, the applicants request withdrawal of all pending rejections and request reconsideration of the pending application and prompt passage to issuance. As an aside, the applicants clarify that any lack of response to any of the issues raised by the Examiner is not an admission by the applicant as to the accuracy of the Examiner's assertions with respect to such issues. Accordingly, applicants specifically reserve the right to respond to such issues at a later time during the prosecution of the present application, should such a need arise.

As always, the Examiner is cordially invited to telephone the applicants' representative to discuss any matters pertaining to this case. Should the Examiner wish to contact the undersigned for any reason, the telephone number set out below can be used.

Additionally, if any fees are due in connection with the filing of this Amendment, the Commissioner is authorized to deduct such fees from the undersigned's Deposit Account No. 12-2252 (Order No. 03-2051).

Respectfully submitted,

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